

## Medibio Limited develops ground-breaking test for stress measurement and its impact on health and wellbeing

**Sydney, Australia – 17 June 2015:** Medibio Limited (**MEB** or the **Company**) is pleased to announce that it has produced and validated the first objective test to measure the level of stress and its impact on health and wellbeing.

The test is the world's first evidence based test for chronic stress. It has been developed using MEB's patented Circadian Heart Rate (CHR) technology and represents a global breakthrough in the diagnosis and treatment of stress.

There is currently no gold standard for the measurement of stress and no available test to objectively assess the impact of stress on health and wellbeing.

Chronic stress is one of the largest issues in healthcare today with research showing that stress contributes to the development of major illnesses such as heart disease, depression and obesity.

The ability to accurately assess the impact of stress via a simple test has the potential to save the workplace and the healthcare system globally billions of dollars. Workplace stress alone costs Australian employers an estimated \$10.1 billion annually <sup>(1)</sup>.

The benefits to Medibio in successfully commercialising the test and the potential markets for the test are significant. The company will focus initially on the workplace stress market following fruitful discussions with potential corporate customers in both Australia and internationally. This market has the potential to generate significant revenues for the company.

The new stress algorithms represent the first "next generation" algorithms developed by Medibio which maintain a diagnostic accuracy in excess of 80% using only data collected during sleep rather than a 24 hour period. The reduction of the time required to assess an individual to less than 10 hours makes the test compatible with the booming wearables category and App market.

### **About Stress**

Stress is a natural human response to pressure when faced with threatening or challenging situations. A certain level of stress is normal, and can be beneficial in enabling people to achieve peak performance. The human body should revert back to its normal state after a certain period of time, following a stress-inducing experience. However, this reversion to normal can be suppressed when individuals are subjected to frequent or repetitive stressful situations. Long-lasting or overwhelming stress can have negative impacts upon human health, wellbeing, relationships, work and general quality of life.

It is well recognised that stress is one of the primary precursors to mental illness. Additionally, the physical problems related to chronic stress include the impairment of the immune response, increased blood pressure, and chronic muscle tension. These problems can eventually lead to serious life-threatening illnesses and studies have found that individuals who have undergone significant stress have a much higher probability of developing serious illness such as heart attacks, kidney disease, and cancer, than non-stressed individuals.

### **Current methods of measuring Stress**

In the absence of a gold standard for the measurement of stress, clinicians adopt three main approaches of stress assessment:

- (1) environmental approach - the occurrence of demanding events (stressors),
- (2) psychological approach - how the individual perceives the stressfulness of each stressor,
- (3) biological approach – measuring the biological elements of the stress response

Subjective questionnaires and interviews are the main measurement tools of the environmental and psychological approach approaches. Questionnaires are subjective and unable to monitor, on a day-to-day basis, differences between stress levels that have not yet progressed significantly towards more serious conditions.

Some biomarkers including salivary cortisol, heart rate, pressure pain sensitivity and galvanic skin response have been used to measure stress. However, they are expensive, can be affected by events immediately before the measurement is taken, and none can measure the impact that stress has had on health and wellbeing.

### **Medibio's Stress test**

Medibio's stress test is based on its Circadian Heart Rate (CHR) technology. A series of new algorithms has been developed to measure the type and degree of deviation of the subject's CHR from normal and the diagnostic significance of this deviation. The critical period for monitoring CHR is the sleep period when external influences are absent, providing an accurate measure of the impact of stress. Medibio's new algorithms accurately classify individuals into one of three categories based on the impact stress has had on their health and wellbeing.

1. **normal to mild:** where no immediate action needed
2. **moderate:** the impact of stress is approaching unhealthy levels
3. **severe:** stress has had an unhealthy impact and lifestyle changes are recommended

Internal validation testing returned excellent results with sensitivities and specificities in excess of 80% for correctly assessing the subject into one of these three stress categories. This compares favorably to the diagnostic accuracy of traditional self-report questionnaires for assessing stress levels which are typically in the 40-60% range.

## Commercial Potential

According to the most recent surveys, excessive stress is prevalent in approximately one quarter of the population <sup>(2 3)</sup> with over 70% citing the workplace and financial situation as primary causes of stress. Recent research undertaken by the Workplace Health Association Australia indicated that 65% of Australian employees reported moderate to high stress levels, and 41% had psychological distress levels considered to be at-risk <sup>(5)</sup>. Various US studies of the economic impact of stress variously estimate the cost of stress to US employers between US\$200 billion to US\$300 billion annually.

Workplace stress is estimated to cause 19% of absenteeism which has been estimated to cost a typical major enterprise \$3.5 million annually. This impact of stress is recognised by employers, particularly in the US, where 90% of corporates with 200 or more employees now offer Corporate Wellness programs. With an annual wellness program spend of US\$100-500 per employee the overall size of the workplace wellness market in the US is estimated at US \$8.2 billion annually <sup>(4)</sup>.

In the lead up to the completion of its objective stress test Medibio initiated discussions with a number of potential corporate customers. The response from all potential customers was extremely positive and indicated a high level of demand for the test in the workplace environment. The key commercial attributes of the test are that it is:

- objective
- easy to administer
- inexpensive, and
- scalable.

Medibio believes that its test not only represents the first objective measure of the impact of stress for the workplace market, but that it is the only new and credible method for assessing stress levels which can translated into the App market.

## Next Steps

Medibio is porting the new stress algorithms into a cloud based environment, where they will run on commercial scale, in parallel with the completion of its corporate stress product including an App based intervention tailored to the assessed level. This is anticipated to be completed in the coming quarter to allow the commercial launch of an end to end solution for assessing and combating stress in the workplace. The company is also working with a number of ECG device manufacturers who want to ensure that their monitors are compatible with Medibio's stress assessment product. The company will also continue discussions with potential customers with the aim of crystallizing these discussions prior to the commercial launch.

<sup>(1)</sup> *Medibank Private - The Cost of Workplace Stress in Australia August 2008*

<sup>(2)</sup> *Stress in America™. The American Psychological Association, 2012*

<sup>(3)</sup> *The Burden of Stress in America. Harvard School of Public Health, 2014*

<sup>(4)</sup> *A Review of the U.S. Workplace Wellness Market, by Soeren Mattke, Christopher Schnyer, Kristin R. Van Busum*

<sup>(5)</sup> *Health Profile of Australian Employees, 2015, University of Wollongong and Workplace Health Association Australia*

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